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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/724,100	12/01/2003	Roderick M. Townes	84715 3054 GNN	1413

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EXAMINER

VERDIER, CHRISTOPHER M

ART UNIT PAPER NUMBER

3745

DATE MAILED: 08/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 10/724,100	Applicant(s) TOWNES ET AL.	
	Examiner Christopher Verdier	Art Unit 3745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 June 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8,10 and 11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8,10 and 11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12-1-03, 6-14-05 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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Applicants' amendment dated June 14, 2005 has been carefully considered but is non-persuasive. Claims 1-8 and 10-11 are pending. Claims 9 and 12 have been canceled, overcoming the objection to the drawings set forth in the first Office action. The replacement sheet for new figure 5 is approved by the examiner. The specification has been amended to correct the informality set forth in the first Office action. The claims have been amended to overcome the rejections under 35 USC 112, second paragraph set forth in the first Office action. The certified copy of the priority document has been received. Correction of the above matters is noted with appreciation.

With regard to Broadhead 5,531,568, Applicants have argued that cooling outlets 30 are positioned along the edge of the surface 23 to dispense cooling air over diagonally extending ribs 31 which serve a completely different function that is contrary to what is sought to be achieved by the present application, and specifically, the turbulator ribs 31 provide turbulence in the cooling airflow to enhance heat exchange between the cooling air and the shroud, and that there is no desire to provide a strata layer as set forth in the presently claimed invention, and that the fences 29 of Broadhead are not configured to cooperate with the turbulence inducing ribs. These arguments are not persuasive, because the flow entrainment fins 29 of Broadhead are configured and arranged so as to create flow channels therebetween, along which the coolant flow directed from release passages 30 is entrained and driven to create a layer strata that is isolated from turbulent air created by a shroud 23 or an unnumbered leading edge of the blade tip. The shroud has sealing fins 32 at the leading edge, which also serve to isolate the layer strata from turbulent air created by the shroud 23 or the leading edge of the blade tip. Column 3, lines 10-15 state that

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the air exhausted from apertures 30 flows as a film across the shroud 23 radially outer surface, which is equivalent to the claimed "layer strata". Concerning Applicants' argument that the fences 29 of Broadhead are not configured to cooperate with the turbulence inducing ribs, this argument is not persuasive because this feature is not set forth in the Applicants' claims.

Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

With regard to Eiswerth 4,390,320, Applicants have argued that there is no disclosure of any structure corresponding to flow entrainment fins arranged and configured to create flow channels along which any coolant can flow to create a layer strata that is isolated from turbulent air created by the shroud of the leading edge of the blade tip, but that all of the cooling apertures in Eiswerth appear to direct the cooling flow substantially radially outwardly into the turbulence created by the blade tip. These arguments are not persuasive, because column 6, lines 54-57 of Eiswerth state that after impinging upon the ribs 32a, 32b, 32c, the air released from the release passages 23, 24 then becomes a film of cooling air along the radially outer portions of the side surface of the ribs. This is equivalent to the claimed "layer strata". In Eiswerth, the flow entrainment fins 32a, 32b, 32c are configured and arranged so as to create flow channels therebetween, along which the coolant flow directed from release passages 23, 24 is entrained and driven to create a layer strata that is isolated from turbulent air created by a leading edge 14 of the blade tip. Because the blade of Eiswerth rotates counterclockwise as seen in figure 3, the film of cooling air along the radially outer portions of the side surface of the ribs 32a, 32b, 32c,

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in the flow channels therebetween, is isolated from turbulent air created by the leading edge 14 of the blade tip (when flowing along the side surfaces of the ribs between the flow channels and radially inward of the exterior of the ribs).

Applicants have not addressed the rejections under 35 USC 102 set forth in the previous Office action based on Lee 5,733,102, Lee 6,790,005, and Japanese Patent Publication 58-47,104, and this amendment could have been held to be non-responsive. See MPEP 714.02 and 714.03. Amended claim 1 defines over these references.

Claim Objections

Claims 5-8 and 10-11 are objected to because of the following informalities: Appropriate correction is required.

In claim 5, lines 2-3, "to form channels for entrainment of the coolant flow" should be deleted, because this limitation is already recited in claim 1.

In claim 11, line 2, "define channels" is objectionable, because this limitation is already recited in claim 1.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3-8 and 10-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which

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applicant regards as the invention. In claim 3, line 2, "the flow entrainment means" is inaccurate and should be changed to -- the flow entrainment fins --. In claim 4, lines 2-3, "the flow entrainment means" is inaccurate for the same reason. In claim 5, lines 1-2, "the flow entrainment means" is inaccurate for the same reason. In claim 11, lines 1-2, "the flow entrainment means" is inaccurate for the same reason.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 5-8, and 10-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Broadhead 5,531,568. Note the blade cooling arrangement comprising a blade tip including a coolant gallery 28 and flow entrainment fins 29, the coolant gallery being in use upstream of the flow entrainment fins 29, the gallery including release passages 30 to release coolant in use close to the blade tip surface with the flow entrainment fins being configured and arranged as to create flow channels therebetween along which the coolant is entrained and driven thereby to create a layer strata that is isolated from turbulent air created by sealing fins 32 of a shroud 23 or an unnumbered leading edge of the blade tip, with the gallery including a cavity from which the

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release passages extend, with the release passages 30 extending laterally towards the flow entrainment fins, with the flow entrainment fins comprising upstanding fins to form channels for entrainment of the coolant flow, the fins extending above the height of the release passages, the fins being substantially perpendicular to the blade tip surface, with each fin having substantially the same height, with the fins providing additional contact surface area for enhanced heat transfer to the coolant airflow, with the flow entrainment fins defining channels through which the coolant flow is driven in use by rotation of the blade tip (see column 3, lines 6-8 and note that the coolant flow through the channels is forced therethrough in a direction opposite to the direction of rotation). Column 3, lines 10-15 state that the air exhausted from apertures 30 flows as a film across the shroud 23 radially outer surface, which is equivalent to the claimed "layer strata".

Claims 1-2, 5-7, and 10-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Eiswerth 4,390,320. Note the blade cooling arrangement comprising a blade tip including a coolant gallery (unnumbered, formed by walls 16 and 17 in figure 3) and flow entrainment fins 32a, 32b, 32c, the coolant gallery being in use upstream of the flow entrainment fins, the gallery including release passages 23, 24 to release coolant in use close to the blade tip surface with the flow entrainment fins being configured and arranged so as to create flow channels therebetween along which the coolant is entrained and driven thereby to create a layer strata that is isolated from turbulent air created by a leading edge 14 of the blade tip, with the gallery including a cavity from which the release passages extend, with the flow entrainment fins comprising upstanding fins 32a, 32b, 32c to form channels for entrainment of the coolant flow, with the fins

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extending above the height of the release passages, and the fins being substantially perpendicular to the blade tip surface, with the fins providing additional contact surface area for enhanced heat transfer to the coolant airflow, with the flow entrainment means defining channels through which the coolant flow is driven in use by rotation of the blade tip (note that the coolant flow through the channels is forced therethrough in a direction opposite to the direction of rotation). Column 6, lines 54-57 of Eiswerth state that after impinging upon the ribs 32a, 32b, 32c, the air released from the release passages 23, 24 then becomes a film of cooling air along the radially outer portions of the side surface of the ribs. This is equivalent to the claimed "layer strata". Because the blade of Eiswerth rotates counterclockwise as seen in figure 3, the film of cooling air along the radially outer portions of the side surface of the ribs 32a, 32b, 32c, in the flow channels therebetween, is isolated from turbulent air created by the leading edge 14 of the blade tip (when flowing along the side surfaces of the ribs between the flow channels and radially inward of the exterior of the ribs).

Allowable Subject Matter

Claim 4 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Verdier whose telephone number is (571) 272-4824. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward K. Look can be reached on (571) 272-4820. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C.V.
August 10, 2005


Christopher Verdier
Primary Examiner
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